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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,473	12/26/2001	Yoshiyuki Miyamoto	NE246-US	2990

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EXAMINER

KOPEC, MARK T

ART UNIT	PAPER NUMBER
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1751

DATE MAILED: 01/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/025,473	MIYAMOTO, YOSHIYUKI	
	Examiner	Art Unit	
	Mark Kopec	1751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____. | 6) <input type="checkbox"/> Other: _____ |

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Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.

Claims 1-8 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility. All of the instant claims are drawn to high temperature superconducting materials comprising C₂₀ fullerene molecules polymerized into a one-dimensional chain. The specification alludes to transition temperatures above 180K for the materials (page 6; Fig 3).

No assertions of superconductivity at such temperatures (or process of making such materials) have been recognized or verified by the scientific community. It is clear from known principles of physics and chemistry that the instant compositions cannot exhibit such critical temperatures according to conventional scientific theory.

Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in

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the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification does not enable one of ordinary skill in the art to make or use a superconductor having a transition temperature above 180 K (or methods of making such materials), in that it would require undue experimentation to do so.

Factors to be considered in determining whether a disclosure would require undue experimentation include, (1) the breadth of the claims, (2) the nature of the invention, (3) the state of the prior art, (4) the level of one of ordinary skill, (5) the level of predictability in the art, (6) the amount of direction provided by the inventor, (7) the existence of working examples and (8) the quantity of experimentation needed to make or use the invention based on the content of the disclosure. In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

(1) the breadth of the claims

Sine all of the claims encompass superconductivity having a transition temperature above 180 K (or methods of making such materials), and it has been shown hereinbefore with respect to the rejection under 35 U.S.C. 101 for inoperability that such cannot exist, the claims are not enabled. The question of whether a specification provides an enabling disclosure under 35 U.S.C. §112, first paragraph, and whether an application

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satisfies the utility requirement of §101 are closely related. Process Control Corp. v. HydReclaim Corp., 190 F.3d 1350, 1358, 52 USPQ2d 1029, 1034 (Fed. Cir. 1999). To satisfy the enablement requirement of 112, first paragraph, a patent application must adequately disclose the claimed invention so as to enable a person skilled in the art to practice the invention at the time the application was filed without undue experimentation. Enzo Biochem, Inc. v. Calgene, Inc., 188 F.3d 1362, 1371-72, 52 USPQ2d 1129, 1136 (Fed. Cir. 1999). The utility requirement of §101 mandates that the invention be operable to achieve useful results. Brooktree Corp v. Advanced Micro Devices, Inc., 977 F.2d 1555, 1571, 24 USPQ2d 1401, 1412 (Fed. Cir. 1992). Thus, if the claims in an application fail to meet the utility requirement because the invention is inoperative, they also fail to meet the enablement requirement because a person skill in the art cannot practice the invention. Process Control, 190 F.3d at 1358, 52 USPQ2d at 1034.

(2) the nature of the invention

As stated above, the scientific community has held the belief that superconductivity having a transition temperature above 180 K (or methods of making such materials) has not been attained. Accordingly, the nature of the invention is such that it would be startling if it were operative, thus requiring

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greater detail and guidance than that found in the instant specification to provide enablement.

(3) the state of the prior art

There appears to be no prior art showing materials possessing superconductivity having a transition temperature above 180 K (or methods of making such materials).

(4) the level of one of ordinary skill

Since even the most highly skilled physicists would agree that according to conventional theory, the instant invention cannot be produced, the threshold of enablement is not met on pages 1-9 of the instant specification.

(5) the level of predictability in the art

It would be most unpredictable that superconductors having a transition temperature above 180 K (or methods of making such materials) have been produced, by the instant methods or otherwise. See the reasoning presented hereinbefore with respect to the rejection under 35 U.S.C. 101 for inoperability.

(6) the amount of direction provided by the inventor (7) the existence of working examples and (8) the quantity of experimentation needed to make or use the invention

The quantum of proof required to establish enablement is inextricably linked with the degree of unpredictability of the relevant art.

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The art of high temperature (above 30K) superconductors is an extremely unpredictable one. Small changes in composition can result in dramatic changes in or loss of superconducting properties. The amount and type of examples necessary to support broad claims increases as the predictability of the art decreases. See In re Fisher, 166 USPQ 18, 24 and In re Angstadt and Griffen, 190 USPQ 214, 218. Claims broad enough to cover a large number of compositions that do not exhibit the desired properties fail to satisfy the requirements of 35 USC 112. See In re Cook, 169 USPQ 298, 302 and Cosden Oil v. American Hoechst, 214 USPQ 244, 262. Merely reciting a desired result does not overcome this failure. In re Corkill, 226 USPQ 1005, 1009.

In the instant specification, applicant has not specifically disclosed any **conclusive evidence** that the claimed materials actually possess a transition temperature above 180 K (or methods of making such materials). Applicant alludes to critical temperatures above 180K (page 6, Fig 3), but no "hard data" has been provided (actual temperature vs. resistivity plots, photomicrographs, etc) to support applicant's contention of such incredible superconductive properties. In fact, no inventive examples appear in the specification. It is unclear if applicant has produced C20 fullerene molecules polymerized

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into a one-dimensional chain, or if such is only a theoretical discussion. At page 6 of the specification, applicant states:

Therefore, the transition temperature of C_{20} Fullerene molecule is $e^{1/2}$ times (about 4.5 times) higher than the superconducting transition temperature of C_{60} Fullerene molecule (40 K) and can be expected to be as large as 180 K which is comparable to a transition temperature of a high-temperature superconducting material.

In view of the above-described consideration, Figure 3 shows the simulated results of a change in electric resistance by temperature. The resistance values are not absolute values and are normalized such that the resistance at room temperature is 1. According to the first-principle calculation, when C_{20} Fullerene molecules are polymerized in a three-dimensional manner, they undergo phase transition and relax from a closed cage structure to an open structure. Since such phase transition weakens the electron-lattice interaction, three-dimensional polymerization has to be avoided.

It appears from this description (of simulated results) that applicant has not actually produced/tested the claimed materials.

It should be noted that at the time the invention was made, the theoretical mechanism of superconductivity in these materials was not well understood. (This is still the case today). Accordingly, there appears to be little factual or theoretical basis for extending the scope of the claims much beyond the proportions and materials actually demonstrated to

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exhibit high temperature superconductivity. A "patent is not a hunting license. It is not a reward for the search, but a reward for its successful conclusion", Brenner v. Manson, 383 US 519, 148 USPQ 689.

As discussed by Professor Chu in a lecture at the Patent and Trademark Office in October 7, 1987, there are generally four measures of superconductivity: (1) zero resistivity, (2) exhibition of the Meissner effect, (3) stability to survive thermal cycling and (4) reproducibility. In the absence of zero resistivity and evidence from the Meissner effect, the sharp resistance drops may be taken only as an indication of the possible existence of superconductivity at unusually high temperatures. Resistivity drops alone are dangerous measure of superconductivity because the drops could be related to problems with testing techniques.

Therefore, the current state of the superconducting art suggests that at least zero resistivity at a reproducible temperature which also shows the Meissner effect is the minimum showing necessary to claim that applicant has produced a material which exhibits superconductivity at very high temperatures.

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In view of the foregoing, the above claims have failed to meet the patentably requirements set forth in 35 U.S.C. 101 and 35 U.S.C. 112, first paragraph.

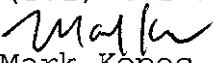
Applicant is reminded that any evidence to be presented in accordance with 37 C.F.R. 1.131 or 1.132 should be submitted before final rejection in order to be considered timely.

The remaining references listed on forms 892 and 1449 have been reviewed by the examiner and are considered to be cumulative to or less material than the prior art references relied upon in the rejection above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Kopec whose telephone number is (571) 272-1319. The examiner can normally be reached on Monday - Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on (571) 272-1316. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1300.


Mark Kopec
Primary Examiner
Art Unit 1751

MK
January 20, 2004